A. BARBEZAT.

STEAM TURBINE.

APPLICATION FILED MAY 2, 1908.

995,517.

Patented June 20, 1911.

Fig. 1.

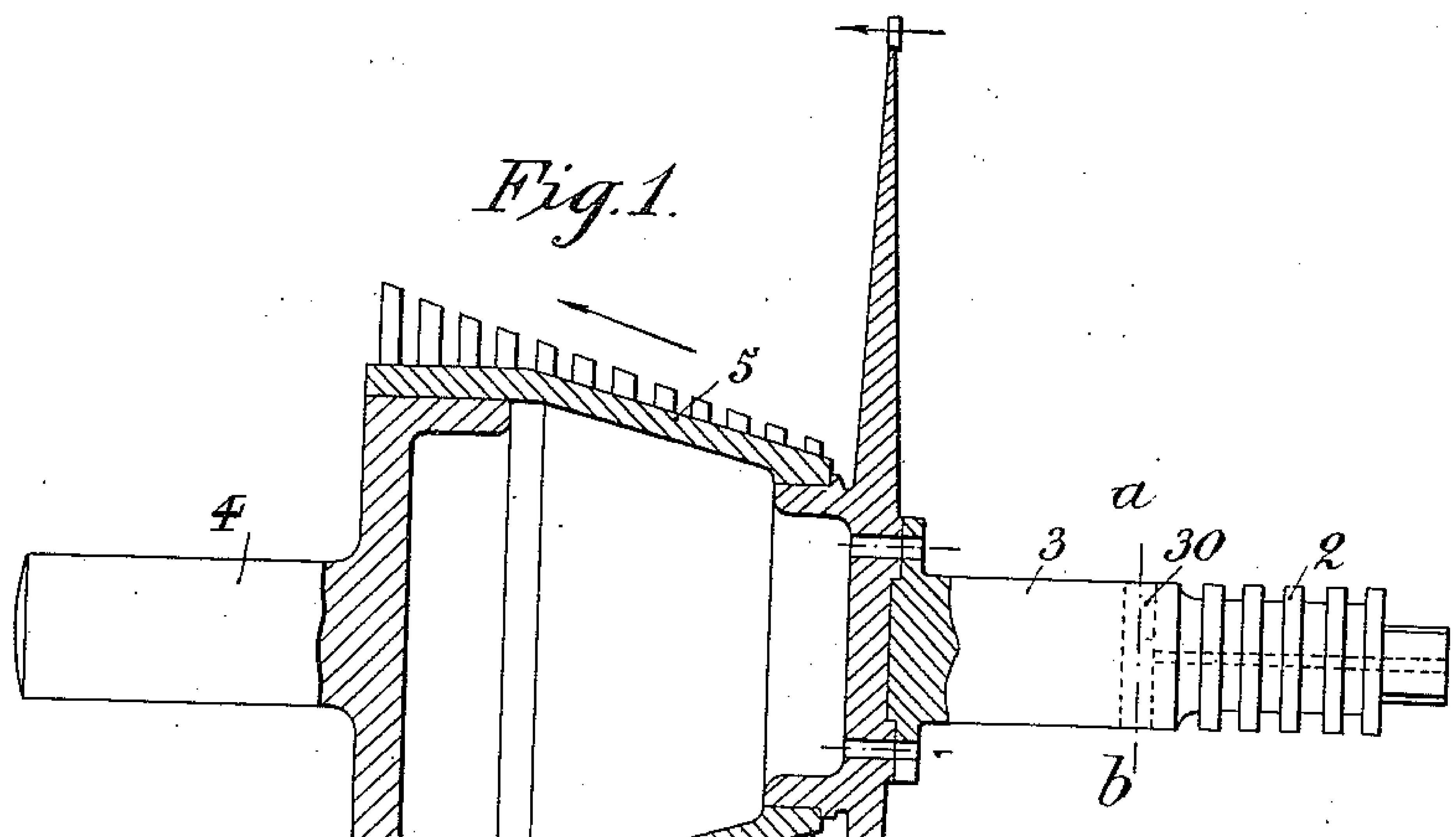


Fig. 4.

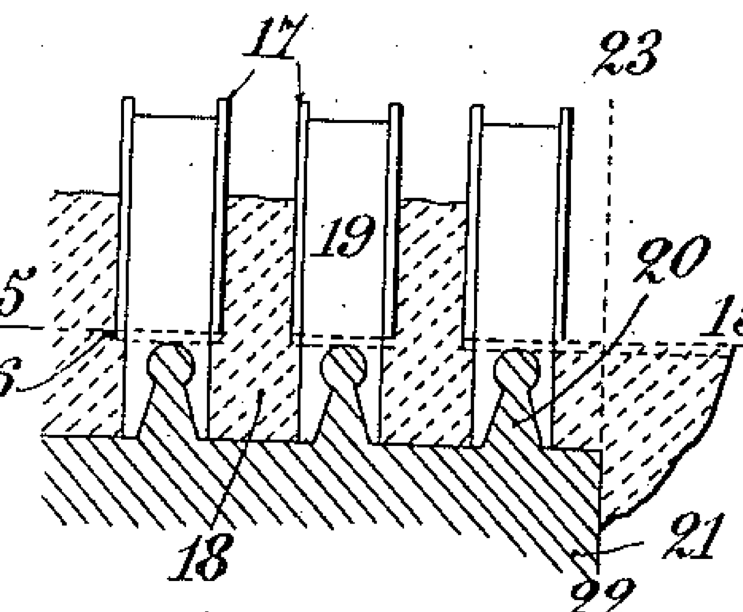


Fig. 2.

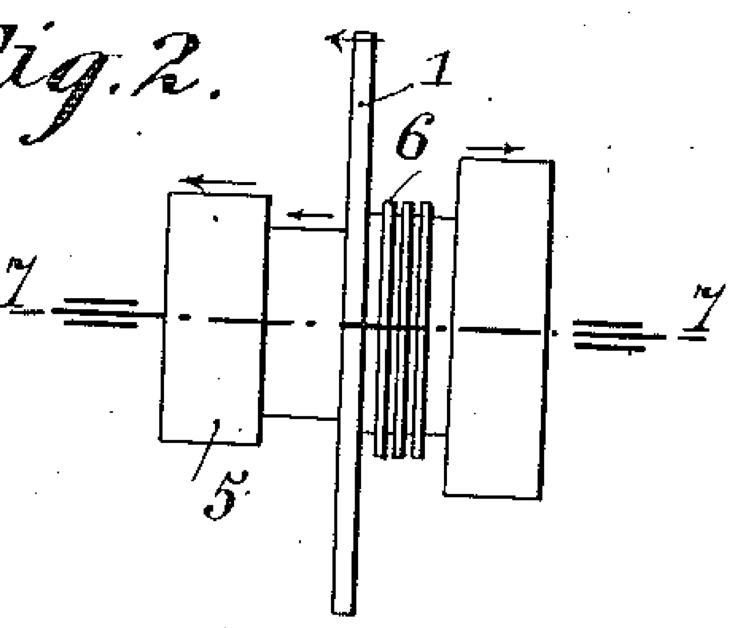


Fig. 5.

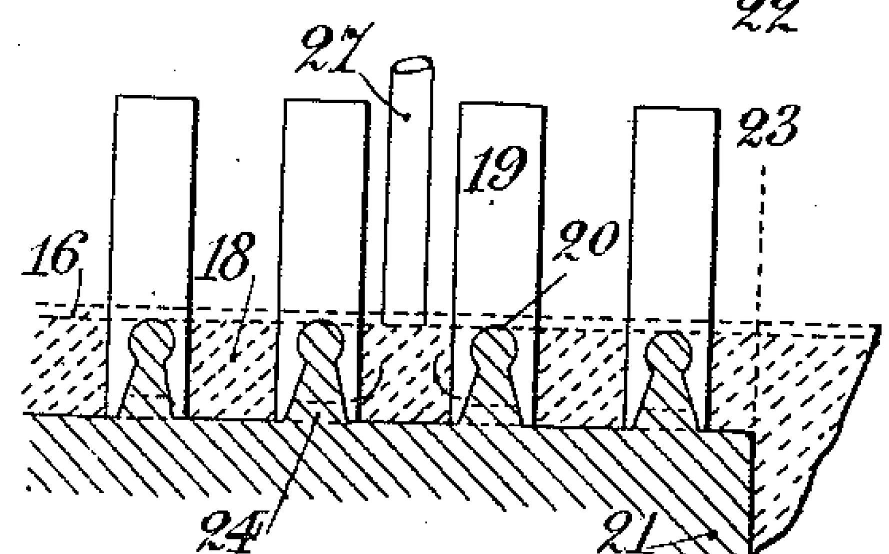


Fig. 3.

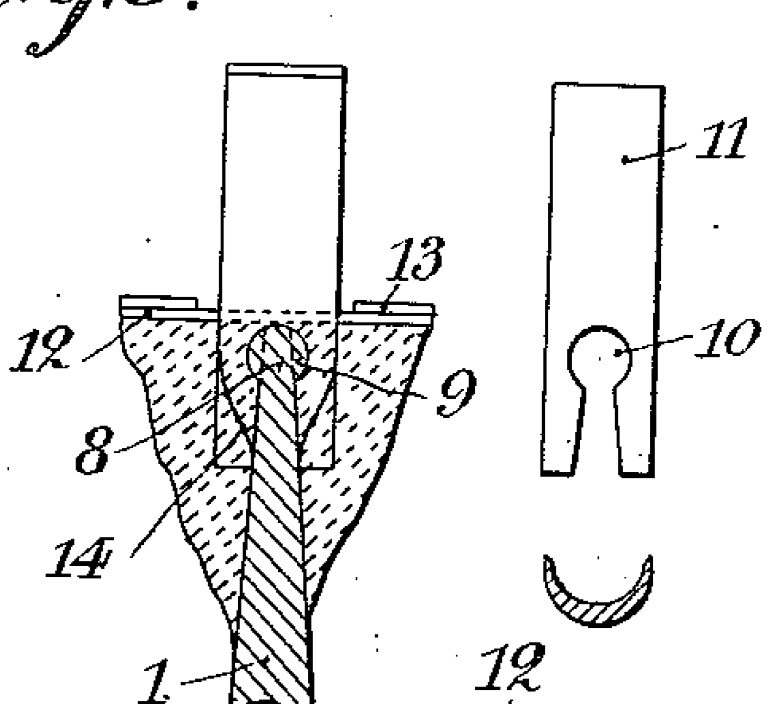


Fig. 6.

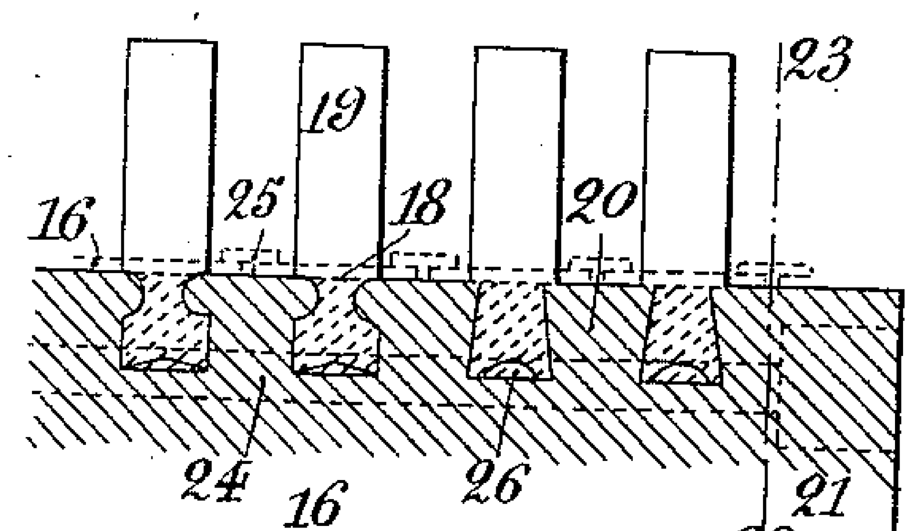
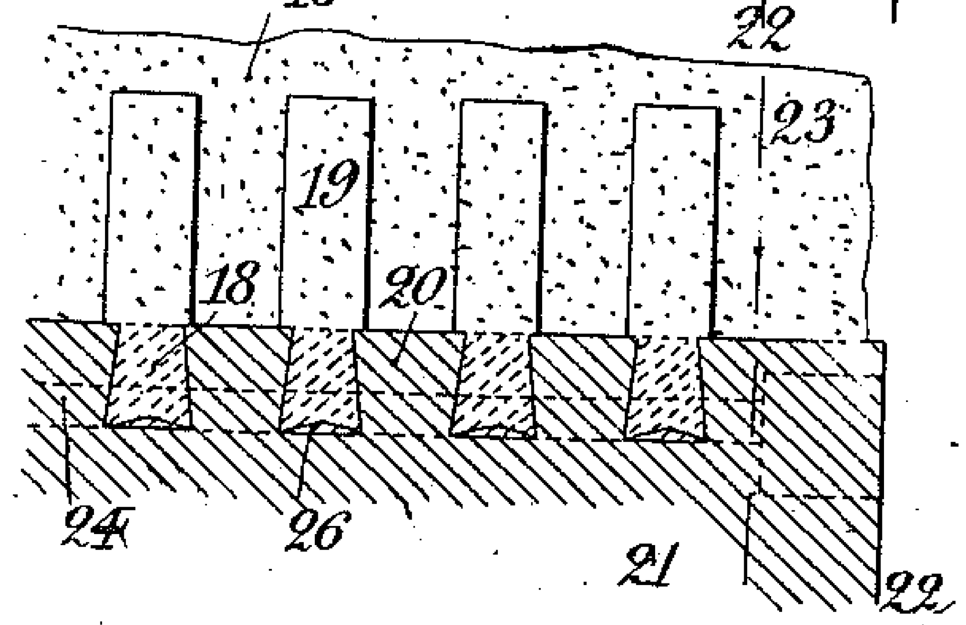


Fig. 7.



Witnesses:

Inventor:

UNITED STATES PATENT OFFICE.

ALFRED BARBEZAT, OF ENGHIEN-LES-BAINS, FRANCE.

STEAM-TURBINE.

995,517. Specification of Letters Patent. Patented June 20, 1911.

Application filed May 2, 1908. Serial No. 430,627.

To all whom it may concern:

Be it known that I, ALFRED BARBEZAT, a subject of the French Republic, and resident of Enghien-les-Bains, France, have invented an Improved Steam and Gas Turbine, of which the following is a specification.

In a turbine using highly superheated steam or hot gases, the temperature of the revolving part, which is hard to cool, must not be allowed to exceed a certain point. The most economical way of attaining this object is to transform the greater part of the heat of the steam or gas by previous expansion into velocity. In the case of steam turbines working with a large ratio of expansion, or gas of low specific gravity, it is possible that th*r* outlet velocities when working with simple expansion could reach 1300 to 1600 meters per second. These velocities are too high to use in a single stage turbine, as considerations of safety forbid the use of velocities of higher than about 400 meters per second at the periphery of the wheel. In order to avoid the multiple-stage construction as Curtis did, the turbine according to this invention, is so constructed that the elastic fluid is allowed to expand in nozzles till it reaches a temperature low enough to be safely used in the running wheel, and at the same time its velocity becomes such as will give economical results in a single-stage action wheel or de Laval wheel. The drop in temperature and remaining pressure are then converted into work in a second receiver, preferably a Parsons drum.

The object in running the larger action wheel with partial feed is 1. to avoid the use of fixed guide blades (Curtis type) since these latter are burned at the points where they are continuously exposed to the stream of hot gases, and 2 to expose the moving blades to the action of the hot gases only during a fraction of a revolution. For the remainder of the revolution the blades are able to cool down and assume a more moderate temperature which the material can withstand. The temperature of the blades alters in the same way as the temperature of the inner walls of a gas engine, the average temperature of whose walls is much below the explosion temperature.

The drawing shows an instance of such a gas or steam turbine and makes clear the fixation of its blades.

Figure 1 is a longitudinal section of a rotor, with the ends of its shaft in elevation. Fig. 2 is an elevation of another style of rotor. Fig. 3 is a group of views illustrating the manner of fixing the blades of the action wheel. Figs. 4, 5, 6 and 7 show four alternatives of this method as applied to a reaction drum.

In Fig. 1, 1 is the action wheel, 3 and 4 the shaft, one side being provided with a thrust bearing 2, and 5 the conical reaction drum. Arrows show the direction of the flow of gas or steam.

In Fig. 2 the action wheel 1 is placed half way along the reaction drum in steps 5, which latter are provided with labyrinths 6, the whole turning in bearings 7—7.

In Fig. 3 the periphery of the action wheel is shown to a larger scale. The disk of the wheel is provided at its circumference with a peripheral projection or flange 8 with one or several openings 9 through the flange, which makes it possible to slip the blades 11 over the ring on the disk. The blades 11 are drawn or milled and provided with mortise 10 fitting about the projecting part 8 of the disk. In order to insure that the blades are equally divided around the periphery of the disk, and to simplify the operation of applying the soldering material, steel plates 12 are inserted between each pair of consecutive blades. These plates are provided with side lugs which are held down during the welding by means of annular straps 13. When the blades, distance pieces and straps are all in place, Fig. 3, the annular space on both sides of the disk, is filled with melted steel. When cold, the parts lying without the profile 14 are turned off so that one can find out if the necessary joint between the blades and the brazing material has been made.

It is obvious that instead of a single peripheral ring 8, a number of such could be used.

In Fig. 4 the method of fixing adjacent sets of blades on the reaction drum 21 is illustrated. A number of rings is provided, each of which is marked 20, and a corresponding number of sets of blades 19 and spacing plates 16. According to this figure the straps 13, Fig. 3, are replaced by metal rings 17, which prevent the soldering material with which spaces 18 are filled up, from penetrating the blades 19. After welding whatever projects above 22—23 and 15—15 (excepting of course the blades) is turned off.

In modification, Fig. 5, the steel plates are as long as is required by the shoulder on the drum and are held during the welding by straps or other means. The spaces 18 are filled with liquid steel through holes 27 and openings 24.

In construction, Fig. 6, the ring has the shape 20, and is provided as before with bands 25, and the spaces 18 are filled with the liquid steel let in through 24, the drum being set vertically. The liquid metal can, on account of openings 26, distribute itself all over the periphery.

Alternative Fig. 7 differs from Fig. 6, in that the plates are replaced by some other body, such as sand, clay 16 or the like which is taken away after the welding.

There is nothing to prevent warming the drum during the process.

Having fully described my invention, what I claim and desire to secure by Letters Patent is:—

1. A turbine having a ring with a lateral projection and buckets embracing said projection and held in place by autogenous welding.

2. A turbine having a ring with a lateral projection and buckets engaging said projection and held in place by autogenous welding, and spacers between said buckets also held in place by autogenous welding.

3. A turbine comprising a drum with a number of rings each of which has a lateral projection, and buckets embracing said projection and held in place by autogenous welding.

4. A turbine having a ring with a lateral projection and buckets embracing said projection welded to said ring.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALF. BARBEZAT.

Witnesses:
DEAN B. MASON,
JEULYAN RAU.